



Setting Standards for Excellence

July 16, 2002

Docket # 01-BSTD-1

Robert Pernell, Commissioner, Presiding Member  
Arthur H. Rosenfeld, Commissioner, Associate Member  
2005 Update Residential & Nonresidential Building Standards Proceeding  
California Energy Commission  
1516 Ninth Street  
Sacramento, CA 95814-5512

Dear Messrs. Pernell and Rosenfeld:

NEMA appreciates the opportunity to comment on the California Energy Commission 2005 Update Residential & Nonresidential Building Standards, Title 24. We are reviewing the top 28 priority measures made available online March 14, 2002. This communication addresses one lighting matter on the priority list. This information provides additional clarification on our comments of July 2, 2002.

The National Electrical Manufacturers Association (NEMA) is the leading trade association in the United States representing the interests of electroindustry manufacturers. Its 500 member companies manufacture products used in the generation, transmission and distribution, control, and end-use of electricity. Annual shipments of these products total \$100 billion.

The topic below is given the same title as in the associated material on your website. NEMA reserves the right to offer further comments on these and other matters in this proceeding.

### **Lighting Controls Under Skylights**

The NEMA Controls group agrees with the basic strategy for daylighting outlined in the proposal:

- Focus on skylighting vs. window wall applications since it's easier to ensure a successful installation.
- Require skylights in "big box" retail and warehouse applications where the technology has already been proven.
- Specify the performance of the skylights and automatic controls.
- Allow astronomical time clocks in lieu of photocontrols.

Our recommendations here are directed at clarifying the intent of the proposal as it relates to automatic controls and making suggestions for improvement. The comments below follow the code language proposals beginning on page 39. The format used is to first state the proposed language, then state our concerns (if any) and then give alternate language to address the concerns.

### ***Requirements for Automatic Multi-Level Daylighting Controls***

**119 (e) Automatic Multi-level Daylighting Control Devices.** Automatic multi-level daylighting control devices shall:

#### *California Proposed Language*

1. Be capable of automatically reducing the general lighting in the controlled area in multiple steps in response to available daylight while maintaining a reasonably uniform level of illuminance. These controls shall have at least one control step that is between 50% and 70% of design illuminance and the controlled electric lighting shall consume less than 35% of rated power at minimum light output. A reasonably uniform level of illuminance in an area shall be achieved in a manner described in Section 131 (b)

#### *Concern:*

The use of “50% to 70%” and “consume less than 35% at the minimum setting” is confusing.

#### *NEMA Recommended Language:*

1. Be capable of automatically reducing the general lighting in the controlled area in multiple or continuous steps in response to available daylight while maintaining a reasonably uniform level of illuminance as described in Section 131 (b) 1 through 3

A. If stepped switching is used, the controls shall provide *at least* two control channels (relays) per zone and be installed in a manner such that at least one control step shall act to reduce the rated power of the general lighting from between 30% to 50% and one other control step shall act to reduce the rated power of the general lighting from between 65% to 100%.

B. If continuous dimming is used, the controlled electric lighting shall consume less than 35% of rated power at minimum light output.

2. OK

3. OK

4. OK

5. OK

*California Proposed Language*

6. If the device uses step switching, status of each control step will be annunciated by an indicator light on the control device

*Concern:*

The commissioning and operational need applies to both dimming and switching systems. In addition, the code should allow both standalone control devices and control systems.

*NEMA Recommended Language:*

6. The control device, or system, shall annunciate the level of the controlled zone

A. If the device uses step switching, the status of each control step will be annunciated by an indicator light on the control device

B. If the device uses continuous dimming, the dimming level will be displayed on the control device.

*Exemption*

*If the control device is part of a networked system with a central display of each control zone level, the status readout on each individual control device is not required.*

*California Proposed Language*

7. If the device has a time delay, the time delay shall be capable of being overridden or set to less than 5 seconds time delay for the purpose of commissioning

*Concern:*

Device may be left in test mode

*NEMA Recommended Language:*

7. If the device has a time delay, the time delay shall be capable of being overridden temporarily to less than 5 seconds for testing or commissioning. The device shall automatically return to the Operate mode, restoring the programmed time delays, after 15 minutes.

*California Proposed Language*

8. The light sensor shall have a linear response with 5% accuracy over the range of luminances measured by the sensor; and,

*Concern:*

No requirements to ensure long-term accuracy or life of the sensor.

*NEMA Recommended Language:*

8. The light sensor shall have a predictable response over its operating range, temperatures and time. Accordingly it shall:

A. have a linear response with 5% accuracy over the range of luminances measured by the sensor at 70 F

B. maintain a 10% accuracy with temperature variation from 32 –100 F

*California Proposed Language*

9. The light sensor shall be separate from the control device where calibrations adjustments are made; and,

*Concern:*

Need to specify the preferred location for the sensor.

*NEMA Recommended Language:*

9. The sensor shall be mounted in one of the light wells within the zone to be controlled and shall be separate from the control device where calibration adjustments are made

10.OK

11. *NEW*

*Concern:*

Overrides to the daylighting control are not addressed

*NEMA Recommended Language:*

11. The lighting control device shall provide a temporary manual override for each control step allowing the user to select a desired light level. The override duration will not exceed 2 hours. At the end of that period, the control device will reinstate the light level dictated by the automatic control operation.

12. *NEW*

*Concern:*

Failure annunciation is not addressed. Title 24 2001 has an exception to this requirement: "Photocell sensors or other devices where a status signal is infeasible because of inadequate power." Since this standard requires the control unit to be separately mounted from the sensor itself, this exemption would not apply.

*NEMA Recommended Language:*

12. The lighting control device or system shall provide a visible warning that the system has failed or malfunctioned.

### **131(b) Controls to Reduce Lighting.**

*Concern:*

The proposed California changes reflect those made in 119 (e) 1 above. The original 131 (b) wording included all lighting within enclosed spaces greater than 100 square feet, not simply those with daylighting.

*Recommended Language:*

Keep the original.

### ***Mandatory Automatic Lighting Controls in the Daylit Zone under Skylights***

*California Proposed Language*

131 (c) **Daylit Areas.** Lamps providing general lighting that are in or are partially in the daylit area shall be controlled according to the applicable requirements in items 1 and 2 below.

1). Daylit areas greater than 250 sq ft in any enclosed space shall have at least one additional multi-level control device that:

A. Controls 50% or more of the lamps in the daylit areas separately from other lighting in the enclosed space and

B. Controls luminaires in vertically daylit areas separately from horizontally daylit areas and

C. Has at least one control step that is between 70% and 50% of design illuminance and

D. Shall maintain a reasonably uniform level of illuminance in the daylit area as described in Section 131(b) 1 through 3

1). When the daylit area in any enclosed space is under skylights and has a total area greater than 2500 square feet, the general lighting in the daylit area under the skylights shall be controlled separately by either

A. An automatic multi-level daylighting control; or

B. A multilevel astronomical time-switch control with an override switching device that complies with section 131 (d) 2

*Concern:*

Original wording of Section 131 (c) 1 is clearer than new version. Description of astronomical time switch lacks detail

*NEMA Recommended Language:*

(c) Daylit areas in any enclosed space greater than 250 square feet shall meet the requirements of 1 and 2 below

1. Such areas shall have at least one control that:

A. Controls only luminaires in the daylit area

B. Controls at least 50% of the lamps or luminaries in the daylit area in a manner described in Section 131(b) 1 through 4, independently or all other lamps or luminaries in the enclosed space. The other luminaries in the enclosed space may be controlled in any manner allowed by Section 131 (b) 1 through 4.

2. Such areas shall have controls that control the luminaries in each vertically daylit area separately from the luminaries in each horizontally daylit area.

(d) When the daylit area in any enclosed space is under skylights and has a total area greater than 2500 square feet, the general lighting in the daylit area under the skylights shall be controlled separately by either

1. An automatic multi-level daylighting control or

2. A multilevel astronomical time switch control that meets the following criteria:

- Has 2 channels (relays) per zone
- Has a separate offset control for each channel of 1-120 minutes
- Is accurate with +/- 15 minutes (sunrise/sunset prediction)
- Battery backup for 10 days
- Stores longitude and latitude in non-volatile memory

- Displays date/time; sunrise and sunset; switching times for each channel.
- Provides a temporary manual over ride for each channel allowing the user to select a desired light level. The over ride duration will not exceed 2 hours.

Again, thank you for the opportunity to comment. I look forward to working with you further on the 2005 amendments under development.

Sincerely yours,



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